purposes of making a complete disclosure of the invention, it may be apparent to those of skill in the art that numerous changes may be made in such detail without departing from the spirit and principles of the invention.

INFORMATION DISCLOSURE STATEMENT

U.S. Pat. No. 5,684,857 (1997) to De Bokx discloses a method for GE-XRF X-ray analysis of materials and apparatus for carrying out the method. FIG. 1 shows an X-ray source 4, a front collimator 14, specimen 16, back collimator 18, and detector 20.

U.S. Pat. No. 5,481,109 (1996) to Ninomiya et al. discloses a surface analysis method and apparatus for carrying out the same (see FIGS. 1, 7–16).

U.S. Pat. No. 5,457,727 (1995) to Frijlink discloses a device for processing a measured signal corresponding to the intensity of X-rays reflected by a multi-layer structure on a substrate. FIG. 7 shows an X-ray source 1, a collimator system 2 and 3, a goniometer specimen support 9, a collimator system 5, and a detector 8.

U.S. Pat. No. 5,384,817 (1995) to Crowther et al. discloses an X-ray optical element and method for its manufacture. FIG. 1 shows an X-ray optical element and method for its manufacture. FIG. 1 shows an X-ray source 12, a sample 16, a device 20 (which can be a collimator), a reflective element 22 and a detector 24. This figure is analogous to the typical arrangement as shown the attached FIG. 1.

U.S. Pat. No. 5,267,296 (1993) to Albert discloses X-ray images produced on a monitor display screen by situating the subject between a detector having a minute X-ray-sensitive area and an x-ray source having an extensive anode plate on which an X-ray origin point is swept in a raster pattern similar to the raster of the display monitor.

U.S. Pat. No. 5,263,075 (1993) to McGann et al. discloses a high-annular resolution X-ray collimator. FIGS. 1–2 show an X-ray source 10, a slit collimator 20, and detectors 32.

U.S. Pat. No. 5,008,910 (1991) to Van Egeraat discloses an X-ray analysis apparatus comprising a sagittally curved analysis crystal. FIG. 1 of Van Egeraat shows a laser source 2, a specimen 6, an analysis crystal 8, a collimator 18, and a detector 16. This figure shows similar arrangement as shown in the attached FIG. 2.

U.S. Pat. No. 4,104,519 (1978) to Oldendorf discloses a method and apparatus for retrieval of exposure information from film images. FIG. 5 shows a raster derive circuit 20, a source 12, a collimator 14, a filter 32, a film 16, and detector 26.

U.S. Pat. No. 3,949,229 (1976) to Albert discloses radiographic images of high definition and clarity produced quickly and with reduced radiation exposure of the subject by utilizing a scanning X-ray source in which a moving point source of x-rays is created by sweeping an electron beam in a raster pattern on a broad anode.

U.S. Pat. No. 3,885,153 (1975) to Schoeborn et al. discloses a multi-layer monochromator. FIG. 2 shows two annular slits to produce a collimated neutron beam 13, a monochromator crystal 11, and a detector 15.

U.S. Pat. No. 3,373,286 (1968) to Han discloses a device for measuring the characteristics of a material moving on a conveyor with means for minimizing the effect of flutter. FIG. 1 shows a radiation source 2, a material 3, (which can be made of metal, plastic, etc. Column 3, lines 55–60), a collimator 12 and a detector 4. This patent shows similar arrangement as required in the reverse geometry embodiment of the attached FIG. 2.

What is claimed is:

1. A scanning X-ray diffraction system for X-ray diffraction measurements comprising:

a. an X-ray source;

b. means for sweeping said X-ray source in a predetermined multi-dimensional pattern to emit X rays successively from different positions relative to a specimen, and to vary the Bragg angle between X rays transmitted to and diffracted by the specimen;

c. an X-ray detector spaced apart from said X-ray source to receive said X rays transmitted to and diffracted by the specimen, said X-ray detector having a radiation sensitive region and having means for producing an electrical output signal indicative of said diffracted X rays impinging on said radiation sensitive region of said detector; and

d. an X-ray collimator disposed between the specimen and said detector, said X-ray collimator directing X rays diffracted by the specimen to said X-ray detector.

2. The scanning X-ray diffraction system as in claim **1**, wherein said collimator is adjacent to said detector and in alignment with said detector to cause said detector to receive diffracted radiation from the specimen.

3. The X-ray scanning system as in claim **2**, wherein said means for sweeping said X-ray source further comprises processing means for correlating the position of the x-ray source with a detector ouput signal.

4. The X-ray scanning system as in claim **3** wherein said processing means further comprises a single channel analyzer whereby the signal pulses of said electric output signal are counted.

5. The X-ray scanning system as in claim **3** wherein said processing means further comprises a multiple channel analyzer whereby each of said electric output signals is sorted by wavelength.

6. The X-ray scanning system as in claim **4**, wherein said system further comprises a display having a raster pattern synchronized with that of said means for sweeping said X-ray source and having an intensity control responsive to said processor means.

7. The scanning X-ray diffraction system as in claim **6**, wherein said detector is movable to any position on a spherical geometry, said spherical geometry having a specimen at its center; and

said collimator having an axis aligned along a radius from said detector.

8. The scanning X-ray diffraction system as in claim **7** wherein an axis of said collimator is movable to any radial position relative to said detector, whereby said detector receives diffracted radiation from each selected position.

9. The X-ray scanning system as in claim **5**, wherein said system further comprises a display having a raster pattern synchronized with that of said means for sweeping said X-ray source and having an intensity control responsive to said processor means.

10. The scanning X-ray diffraction system as in claim **9**, wherein said detector is movable to any position on a spherical geometry, said spherical geometry having a specimen at its center; and

said collimator having an axis aligned along a radius from said detector.

11. The scanning X-ray diffraction system as in claim **10** wherein an axis of said collimator is movable to any radial position relative to said detector, whereby said detector receives diffracted radiation from each selected position.

12. A scanning X-ray diffraction system for X-ray diffraction measurements comprising: